Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 53 January, 1951 No. 625

BOTANIZING ON THE GASPÉ PENINSULA 1902–1904

M. L. Fernald[1]

Half-a-century ago the name Gaspé meant little or nothing to most botanists of northeastern America. To those with a more intimate knowledge of earlier collections it merely meant the general region which included Mt. Albert and Tabletop and a few other localities where John A. Allen (1863–1916), in 1881, and John Macoun, in 1882, had found a few local or unusual plants. These I happened to know about because, while he was working on the *Polypetalae* for Gray's *Synoptical Flora*, Dr. Robinson had called them to my attention. Otherwise, to me and more so to most others Gaspé was just a large peninsula on maps of the Province of Quebec.

In July, 1902, Emile F. Williams[2] and I, after being the guests of Dr. George G. Kennedy[3] at Cutler in eastern Maine, found ourselves with a couple of weeks left of Williams's vacation. On the bleak outer coast near Cutler we had been duly impressed by the subarctic or high-northern plants (*Iris Hookeri*,[4] *Montia lamprosperma*, *Sedum Rosea*, *Empetrum nigrum*, etc.). Consequently, by a very simple line of reasoning we concluded that,

[1] Until the day of his death, Professor Fernald had been working on a journal account of field trips to the Gaspé Peninsula, projected to cover the years from 1902 to 1934. He had sufficiently completed the years 1902–1904 to make this portion of his manuscript publishable.—Eds.

[2] See biographical sketch with portrait by B. L. Robinson in Rhodora, xxxiii. 1–18 (1931).

[3] See biographical sketch with portrait by Emile F. Williams in Rhodora, xxi. 25–35 (1919).

[4] Authors omitted if names in Gray's Manual, ed. 8 (Fernald).

since a considerable element in the flora of the eastern Maine coast is subarctic, and since Labrador has a still more arctic flora, the obvious thing to do would be to go to a point midway between Cutler and the Labrador coast. Measurement on a map and railway time-tables soon showed us that Bathurst, New Brunswick, was to be the magic spot. So we were soon established at Bathurst. A few days in that flat region, without obvious heights and with great fields of cultivated hops, was an eye-opener; a relatively southern flora, shared with adjacent stretches near the southern coast of Bay Chaleur and for some distance to the south.

Since Emile Williams was born in France, partly of French stock, with a great love of that country, I was inclined to jeer him for imagining that the flora around the Bay Chaleur ("Baie des Chaleurs" of Cartier, its discoverer) would be subarctic. But there we were, surrounded by many of the most common and usually ignored species of eastern Massachusetts, several of them, naturally, here reaching or approaching their northern limits. *Lophotocarpus spongiosus*, *Scirpus maritimus* var. *Fernaldi* and *Tillaea aquatica* were in the saline marshes of the region and sharing the salt-marshes with them was a very striking extreme of *Aster subulatus*, the isolated endemic var. *obtusifolius* of a coastwise species which reaches its limit of continuous range (north from Florida) on the marshes of southernmost Maine. On the dunes and sands, similarly, the southern *Lechea maritima* (eastern Virginia to southern Maine) was represented by the isolated and likewise endemic var. *subcylindrica*.

Chagrined that our confident expectation of a subarctic coastal flora was completely thwarted, we did not fully grasp the significance of our discovery, that the south side of the Bay Chaleur has a relatively southern, rather than northern, flora, although, later on when the full significance of this condition was realized, I urged my student, now Dr. Sidney F. Blake, to carry on the study of the region east, west and south of Bathurst in 1913. His important and significant results appeared in RHODORA, XX. 101–107 (1918) and in subsequent notes. Blake recorded several additional species which "find their northern limit" in northeastern New Brunswick, these extending north from Florida, Georgia, North Carolina or Virginia and here noted under their

now accepted names: *Juncus effusus* var. *solutus*, *Myrica pensylvanica*, *Comptonia peregrina*, *Betula populifolia*, *Quercus rubra*, *Amelanchier stolonifera*, *Samolus parviflorus* and *Teucrium canadense*, further evidence that the flora of the southern coast of Bay Chaleur or areas adjacent is not boreal. Most of the region visited by Blake is covered by outwash-sands and -gravels of glacial origin, but the extreme outer limits lie beyond the glacial gravels. There he got two plants of the utmost significance: *Atriplex sabulosa* Rouy (*A. maritima* E. Hallier, not Crantz), discussed by Blake in Rhodora, xvii. 83–86 (1915) and its range (wholly outside the limit of glacial outwash) shown by me in Proc. Internat. Congr. Plant Sci. Ithaca, N. Y. 1926, ii. 1501, 1503 (map 32a) and 1504 (map 32b); and a local variety (var. *contiguus*) of the strangely isolated endemic *Aster laurentianus* of unglaciated spots about the Gulf of St. Lawrence, a map of which closely resembles the American map (32b) of *Atriplex sabulosa*.

Returning to Williams's and my disappointment of 1902, we will pick up that thread. Across the Bay the skyline was much higher and, since we still had a subarctic flora on our minds, we began to be interested. Consulting a map, we discovered that we were looking across to the southwestern base of the Gaspé Peninsula. Recalling that somewhere on that to botanists little-known land some interesting plants had once been found, we decided to try our luck. At that time the Atlantic and Lake Superior Railway had its western terminus at Matapedia, at the junction of the Matapedia and Restigouche Rivers and at the head of the Bay, its eastern terminus at New Carlisle, county-seat of Bonaventure County, Quebec. Breakfasting in the early morning on the slaty ledges by the lower Restigouche, with *Ulmus americana* overhanging us and tall stinging plants of *Laportea canadensis*, northernmost member of a chiefly tropical genus, suddenly bending toward us in the breeze, we could not feel that we were approaching the Arctic! But we went on to New Carlisle, secured comfortable quarters and a wide-awake hibernian driver, Lawrence, and began exploration by wagon, westward to the great arbor-vitae swamp at the mouth of Bonaventure River, eastward to the mouth of Port Daniel River.

Botanical thrills were, unfortunately, few. The best discovery was, perhaps, *Salix myrtillifolia*, a beautiful shrub of arbor-vitae swamps, here found for the first time east of the Cordilleran region. In similar habitats the cottony-white *Salix lanata* was abundant. One of the most conspicuous members of the genus, it was new to our experience, for it is so fastidious as to avoid much of New England. Abounding in calcareous areas centering on the Gulf of St. Lawrence, it is unknown in New England except in the more northern and western areas of limestone. *Collomia linearis*, primarily western, was new to us, and we were surprised to find *Polygonum viviparum* growing at sea-level; and on the great beach at Paspébiac Point we were delighted with a wholly strange *Agropyron*, typical long-spiked *A. trachycaulum*, the first (but not the last) from east of western North America. Here also was a strange *Draba* with very large fruit, the type-series of *D. glabella*, var. *megasperma*, and we had the satisfaction of seeing for the first time so far south *Euphrasia arctica* and the tiny *Plantago juncoides*, var. *glauca*. A few weeds were interesting: *Hyoscyamus niger* was too abundant, the poisonous slime of the plant making us cautious about picking late strawberries; and *Geranium pratense* was more or less abundant from New Carlisle to Port Daniel. Near the latter village Williams and I got out to look over a salt-marsh. We had hardly ventured in before the owner came to drive us out of his "hay-field". After some explanation, he consented for one dollar to let us look it over—for nothing of significance. But Lawrence's Irish was aroused. As we were leaving he rose full-height in the wagon and shouted for all Port Daniel to hear: "Folks down here is so mean they'd skin a lice to get his taller". At least, we had a loyal escort through the country.[5]

[5] One incident of much stronger savour than Lawrence's thrust was too absurd to be forgotten. Williams, then a prosperous bachelor, proprietor of an expensive and fashionable store in Boston, was an epicure. His bachelor-dinners were famous for the remarkable and delicious dishes (largely or wholly prepared by himself). Probably he had never dealt with dried salt cod. At any rate, slightly east of New Carlisle the gravel-beach of Paspébiac was white for many acres with drying salted cod. Suddenly Williams recalled that Dr. Kennedy, telling of a sailing trip he once took to Chaleur Bay, had repeatedly expressed his regret that they could not land and get one of those beautiful white fish. I, too, had heard the Doctor express his yearning for one. So, now his life-long ambition was to be fulfilled. Going to the great warehouse, Williams dramatically told the story to the manager of the great fishery. With characteristic kindness he consented to help in the mission.

All in all, about what we accomplished was the slight extension northward (not southward) of the then known ranges on the continent of many species which abound in New England: *Juniperus communis* var. *depressa*, *Sagittaria latifolia*, *Spartina pectinata*, *Eleocharis intermedia*, *Carex projecta*, *C. Bebbii*, *C. Buxbaumii*, *C. debilis* var. *Rudgei*, *C. hystricina*, *Corallorhiza maculata*, *Liparis Loeselii*, *Rumex mexicanus*, *Epilobium strictum*, *Sium suave*, *Apocynum androsaemifolium*, *Scutellaria lateriflora* and *epilobiifolia*, *Lycopus americanus*, *Chelone glabra*, *Galium trifidum*, *Viburnum cassinoides*, *Solidago flexicaulis*, *Aster macrophyllus* and *cordifolius* and scores of others. We returned home with a feeling that at least the southwestern region of the Peninsula (Bonaventure County) was most ordinary, and our dream of a subarctic flora there was dissipated. Accordingly, we abandoned any thought of returning.

Suddenly, however, the scene shifted. Two enthusiastic field-botanists who thought themselves acute had, by horse-and-buggy botanizing, failed in a cursory trip along the southern coast of more than half of the Gaspé Peninsula, to find much of anything which would induce them to return. Then, suddenly, a kind friend of the writer, who had no herbarium and had not previously collected plants, started the sensation. The late George Henry Richards (1838–1922), joining his friend, Louis Cabot of Boston, then the owner of the seigniory of Grand River in southern Gaspé County, for salmon-fishing and remembering my earlier interest in the general region, collected a few samples for me in July of 1903. This little package was,

Going outside, he waved his arms and pronto! all the hundreds of men and women ceased work and vanished from sight. Then Williams picked out as plump and juicy a morsel as could be found among the acres of drying fish and asked the price. "I will have to figure it; we usually deal in wholesale lots," was the response. Returning to the office and figuring, the result was worked out: "four cents, please." Carefully wrapped, the prospective gift was hidden in Williams's trunk, in order that the chamber-maid might not be surprised. Now it so happened that at this period the proprietor of the hotel went on a three-day debauch. Hopelessly intoxicated and trembling, he was pitiable, and service became disorganized. On the third evening, returning from a day in the field, we were greeted by a most disgusting odor as we entered the door. "There," said Williams, "the poor devil has wrecked the toilet; we must get out of here"; but, entering our own room, we immediately knew the source of the latest trouble. The foul thing was smuggled out in the darkness of night. Two days later we reached the ultra-fashionable Chateau Frontenac at Quebec; and before Williams's return to Boston the trunk and its contents were disinfected and deodorized. Dr. Kennedy never had a codfish from Paspébiac Beach.

indeed, an eye-opener: an undescribed species of *Comandra*, which was later published as *C. Richardsiana;* a new *Amelanchier*, the later-distinguished *A. gaspensis*, now known to have a wide northern range, chiefly on calcareous soils; a strange little *Orobanche*, which, when abundant material became available, was described as *O. terrae-novae*, a species of calcareous slopes or mountains, either in the open or under *Picea glauca*, in western Newfoundland, on Anticosti and in Gaspé and Rimouski Counties, Quebec, whereas the more southern and technically quite different *O. uniflora* (southwestern New Brunswick to Montana, south to Florida, Mississippi and Texas), is a plant of deciduous forest and less calcicolous.[6]

He also had an amazing series of novelties in the genus *Anemone* (the new *A. multifida*, var. *Richardsiana* and some novel color-forms) and the first recognized American material of *Taraxacum lapponicum*. Obviously Williams and I had seen only the uninteresting and much cleared and pastured exterior. From June 30 to July 3, 1904, I joined Mr. Richards as Mr. Cabot's guest at the fishing-camp some miles up Grand River.

While waiting on the morning of June 30 for the canoeman from up-river, I found, near the house, a wonderful little marl-bottomed bog. Here was a thicket of the lustrous-green *Salix myrtillifolia* again, and sharing the margin of the bog two strange willows: *S. candida*, not at all candid, for it was the rare green-leaved forma *denudata*, from our only Gaspé station; and the *S. humilis*, instead of having leaves narrow and grayish-pilose beneath, had the obovate blades half as broad as long and as white-tomentose as *S. candida* should have been, the first evidence so far east and our only station on the Peninsula of *S. humilis* var. *keweenawensis*. Beyond the thicket the bog was beautiful with the deep red flowers of *Rubus acaulis*, our only station in southern Gaspé; and here were *Carex livida* var. *Grayana* (otherwise known in southern Gaspé only on marly bogs at Bonaventure River) and the very definite *C. lepidocarpa*, a species known outside Europe only about the Gulf of St. Lawrence and Lake Mistassini. It was too early for most bog-plants but, obviously, this little bog needed watching.

As already noted in the sketch, *Incidents of Field-work with J.*

[6] For some detail see RHODORA, XXXV. 308 (1933).

Franklin Collins,[7] up-river botanizing was restricted to a few spots where my host wished to fish, he fearing that otherwise I might be noisy and disturb the salmon. Consequently, many spots which looked like the best botanizing-grounds along the steep-walled little (not very "grand") river were untouched. Nevertheless, the discoveries were remarkable. The general flora was Canadian (we were not seemingly in eastern Massachusetts), with the typical eastern Canadian plants of rich woodland and calcareous slopes and shores: *Selaginella selaginoides, Poa alpina, Carex vaginata* and *scirpoidea, Tofieldia glutinosa, Calypso, Cypripedium Calceolus* var. *parviflorum, Salix glaucophylloides* and *pellita, Anemone riparia, Dentaria diphylla, Draba arabisans, Viola nephrophylla, renifolia* and *Selkirkii*, etc. But mingled with these always interesting Canadian species in the unspoiled woods or on limy bluffs or shores there were others which greatly excited me. The leafy Yellow Violet, *Viola pensylvanica* var. *leiocarpa*, there seemed to have got too far north, although we now know it to be the more northern extreme of a relatively southern species; and *Polygala paucifolia* (the only time I ever saw it so far north) seemed out of place. But plants I had never before met were the great source of thrills. *Valeriana septentrionalis* was on the seeping banks with *Anemone parviflora, Thalictrum alpinum* and *Listera auriculata;* the beaches were carpeted by the northern cordilleran *Dryas Drummondi* and here and there tussocks of the likewise supposedly Rocky Mountain *Sisyrinchium montanum*. Dry rocks or rocky slopes bore *Carex concinna*, new to me; rich but not too wet banks were carpeted with *Cystopteris montana, Osmorhiza obtusa* of the Rockies and *Lycopodium sabinaefolium* var. *sitchense*. These and many others, mostly new to my experience, made me wish that Emile Williams could see a bit of this unspoiled Gaspé; but the great prizes were, of course, abundant colonies of the new *Comandra* and Mr. Richards's new red Anemones, and two very distinct native Dandelions; the local and large-headed species later described, from abundant material from northwestern Newfoundland, as *Taraxacum Longii;* and the small-headed *T. ceratophorum* (with utterly different achenes), which later proved to be rather general on the Gaspé limestones. *Senecio aureus*, too,

[7] Rhodora, xliv. 98–147, with 12 plates (Contrib. Gray Herb. no. cxl.), where some details of several explorations of the Peninsula are given.

seemed very strange, two different leaf-variations which I had never before seen: var. *semicordatus*, subsequently found westward to the lower Restigouche, and the then undescribed northern var. *aquilonius*. As if these excitements were not sufficient, *Arnica*, which I had always known only through *A. mollis*, with subplumose tawny pappus, here had very narrow leaves and barely barbellate white pappus, the original collection of *A. chionopappa*, which subsequently proved to be a characteristic species on calcareous slopes near sea-level in Gaspé and western Newfoundland. Then, the only representatives of *Antennaria* seen along the river were a peculiar extreme of *A. neodioica*, the new var. *interjecta*, afterward found to be more characteristic of calcareous ledges of Rimouski County, and another, suggesting *A. canadensis* but with more or less flagelliform stolons and with most of the cauline leaves with elongate pale appendages, the type-series of the new *A. appendiculata*, a calcicolous species subsequently found on the limestones of western Newfoundland, Anticosti Island and near the foot of James Bay—thus having a real range.

It was as difficult to leave such a rich area, with a new discovery at every turn, as it had been easy for Williams and me to abandon the region slightly to the west after our disappointing experience of two years earlier. Now it was clear that, as soon as the beaten roads, cleared farms and pastured roadsides (for cattle wandered unfenced along the roads) were left behind, Gaspé would prove to be a land of botanical surprises. But appointments with the Josselyn Botanical Society of Maine took me to Fort Kent and St. Francis in northern Maine, there to discover the endemic *Carex Josselynii* and the original station for *Viola novae-angliae*. However, later in the summer, stimulated by my brief Grand River experience, the late Professor J. Franklin Collins and Professor Arthur Stanley Pease joined me in a gradual return to Grand River and points beyond. The high lights of this and later trips with Collins and Pease or with Collins or other companions have largely been noted in the sketch already referred to. Certain botanical observations and records of interest were there necessarily omitted. Several requests for fuller lists of significant species and their localities having come to me, I am here refreshing my memory and somewhat supplementing the memoranda already published.

On the way to Grand River in late June, I had spent a day or two looking over the country from Matapedia to Escuminac; and on the way toward Carleton, where we were to be joined by Pease, Collins and I utilized a couple of days in further checking the plants of this southwestern corner of the Peninsula. As was the case when Williams and I were there, most of the specialties were relatively southern species, but a few were of more interest to us. Reaching Matapedia long before the start of the train eastward, we made as complete a survey of the lower Restigouche there as time and the earliness of the season allowed. A few additional northern limits in this direction were noted (some of the northeastern ranges later extended eastward). *Veratrum viride*, *Cornus rugosa*, *Apocynum medium* and *sibiricum*, *Lilium canadense*, *Carex aurea* and *gracillima*, *Potentilla arguta*, *Prunus depressa* and *Osmorhiza longistylis*, not noted by Williams and me, were quite reminiscent of New England; but, giving a more northern calcicolous aspect, were other natives which are unknown in New England or are there confined to the higher or more northern areas: *Poa alpina*, *Carex capillaris* var. *major*, the later-described *Allium Schoenoprasum* var. *laurentianum*, *Astragalus eucosmus* and *alpinus* var. *Brunetianus*, *Oxytropis johannensis*, *Hedysarum alpinum* var. *americanum*, *Osmorhiza chilensis*, *Castilleja septentrionalis*, *Pinguicula vulgaris*, *Erigeron hyssopifolius* and *Prenanthes racemosa*.

Best of all, here were two of the red-flowered Anemones of the Grand River ledges and five species which neither of us had ever met before: *Scirpus rufus* var. *neogaeus* and *Carex bipartita* var. *amphigena*, a strange *Salix* which we subsequently found in better condition at the mouth of Grand River, the new *S. paraleuca*, a strange new *Antennaria*, *A. rupicola*, and a peculiar villous-hirsute and tiny-headed extreme of *Hieracium canadense*, the still rather anomalous var. *hirtirameum*. In a couple of hours the banks of the lower Restigouche at Matapedia had yielded almost as many plants of interest as Emile Williams and I could turn up at the same season of the year on our disappointing "horse-and-buggy" trip of two years before!

We took the train only a few miles, to the village of St. Jean l'Évangeliste, near the mouth of Nouvelle River, and spent the day driving some distance up the river, the shores of which, so

far as we went, had been denuded by glaciers and were boulder-strewn and of somewhat acidic or noncalcareous rock. Consequently, the typically calcicolous plants of the lower Restigouche were lacking. Instead, the vegetation was, like so much which Williams and I had encountered, tediously uninteresting to a New Englander; mostly the common plants of the less fertile sections of that region. To a great extent, however, they were here at or near their northeastern limit (except near the River St. Lawrence), on the continent and, on that account only, the following are enumerated: *Scheuchzeria palustris* var. *americana*, *Scirpus americanus*, *rubrotinctus*, *atrovirens* var. *georgianus* and *pedicellatus*, *Eriophorum tenellum*, *Carex rosea*, *Crawfordii*, *tenuiflora*, *communis* and *hystricina*, *Salix Bebbiana*, *Populus tremuloides*, *Alnus rugosa* var. *americana*, *Nuphar variegatum*, *Ranunculus recurvatus*, *Clematis virginiana*, *Sarracenia purpurea*, *Amelanchier laevis*, *Rhus typhina*, *Acer rubrum*, *Epilobium leptophyllum*, *Cicuta maculata* and *bulbifera*, *Sium suave*, *Pyrola elliptica*, *Kalmia angustifolia*, *Gaultheria procumbens*, *Vaccinium myrtilloides*, *Convolvulus sepium*, *Lycopus uniflorus*, *Utricularia vulgaris* and *cornuta*, *Galium asprellum*, *Diervilla Lonicera* and *Hieracium scabrum*. Nothing could be more tediously uninteresting to one who is familiar with the common run of plants southward or westward, but a few species along Nouvelle River kept us from being too much bored. Here was the slender-fruited extreme of *Carex flava*, later to be seen along other rivers, the rather localized var. *gaspensis;* and *Poa irrigata* Lindm. (in a sphagnous spruce-swamp), *Luzula pallescens* and *Gnaphalium sylvaticum*, all afterward found farther to the east, were the first known outside Eurasia; while the continental *Trillium erectum* we never again met on the Peninsula.

Reaching Carleton, we had our trunks unpacked and the work-room in order when Pease arrived. The main incidents of the really thrilling remainder of the summer have already been published in the paper on field-work with Collins and may not here be repeated, but for completeness of the record some significant plants, mostly not there enumerated, are here noted. The area about Carleton has three strikingly contrasted physiographic or phytogeographic divisions: the flatter country, very slightly glaciated, with calcareous soils and several limy arbor-

vitae swamps; the long flat Tracadigash Point, a great expanse of gravel extending far out into the Bay Chaleur; and, some miles back, the precipitous-topped and sharp-prowed mass of Tracadigash Mountain, rising far above the glaciated lowland base and reaching a height of 1930 feet, as determined by Collins's aneroid.

The woods or adjacent clearings were the homes of *Polystichum Braunii* var. *Purshii*, *Poa saltuensis* var. *microlepis*, *Sphenopholis intermedia*, *Carex Deweyana*, *Goodyera repens* var. *ophioides* and *tesselata*, *Polygonum cilinode*, *Actaea rubra*, *Geranium Bicknellii*, *Aralia racemosa*, *Pyrola asarifolia*, *Galium Aparine*, *Solidago canadensis* and the other characteristic plants of such habitats generally in the northeastern United States and adjacent Canada. In the low depressions were found *Eleocharis elliptica* and *pauciflora* var. *Fernaldii*, *Juncus Dudleyi*, *nodosus*, *alpinus* (typical) and its var. *rariflorus*, *Parnassia parviflora* and other wide-ranging species. In the arbor-vitae swamps various nice sedges and such distinctive plants as *Orchis rotundifolia*, *Malaxis brachypoda*, *Salix lucida* var. *intonsa*, a very pubescent-leaved gooseberry (*Ribes hirtellum* var. *calcicola*, also on the seepy limy slopes of Tracadigash Mountain and its type from the marly arbor-vitae swamp at the mouth of Bonaventure River) and *Senecio indecorus*, all plants of wide general northern distribution.

It was the gravels and turf of extensive Tracadigash Point and the steep slopes, talus and cliffs of Tracadigash Mountain which supplied the striking species. Taking in systematic sequence the specialties of Tracadigash Point, we begin with the type-collection of *Puccinellia laurentiana*, a local species of maritime habitats of eastern Quebec and adjacent New Brunswick, typical *Agropyron trachycaulum* (already noted from Paspébiac Beach), *Zigadenus glaucus*, largely confined to the St. Lawrence basin, the type-collection of *Arenaria litorea*, a species which later proved to be inseparable from *A. dawsonensis*, described from northwestern North America but now known to be essentially transcontinental, *Stellaria longipes* (the pale and dwarf form known as var. *laeta* (Richards.) T. & G.), *Thalictrum confine*, *Arabis brachycarpa* (then the first from eastern North America but now merged with *A. divaricarpa* and known to be transcontinental northward), the type-collection of *Viola adunca*, var.

glabra (now known by an earlier varietal name, var. *minor* and also known to have a boreal transcontinental range) and *Achillea lanulosa*, another transcontinental species which follows the coast southward to New England. Tracadigash Point was, at that time, pretty thrilling but its specialities have mostly proved to have broad and subcontinuous boreal distribution.

Quite as interesting an area near Carleton is Tracadigash Mountain. Rising more than 600 feet above the slightly glaciated foreland, its steep slopes and upper calcareous cliffs are the home of the chiefly western *Collomia linearis*, *Poa Canbyi* (in this area and in the Lake Superior region isolated from the Rocky Mts.), *Carex praticola* (boreal, with greatly disrupted range), *Coodyera oblongifolia* (its areas likewise disrupted, with gaps of many hundreds of miles in its transcontinental range) and *Hackelia americana*, then unknown from east of western North America. Along with these more interesting species were others of more local interest: *Dryopteris fragrans* var. *remotiuscula*, *Polystichum Lonchitis*, *Carex Backii*, *Smilacina racemosa* (only time seen on the Peninsula), *Clematis verticillaris* and *Corydalis sempervirens*. Tracadigash (or Carleton) Mountain is really the southwestern end of a high range of low mountains which there swings to the west but eastward reaches the Grand Cascapedia and follows up that valley, the range having a length of about 40 miles. We merely touched it. Exploration of the high unglaciated crest would yield other fine specialties.

"A range of low mountains runs northeast and southwest along the west side of Cascapedia bay at a distance of 2 or 3 miles from the shore, and then bends westwards at Carleton, where some work was done. A good path leads up Carleton mountain, whose height is given as 1,830 feet, the lower part being of slate and the highest point consisting of weathered diabase or porphyrite. A certain amount of drift was seen up to about 1,200 feet, where boulders of a basic eruptive occur resting on the slate. Whether these are ice transported is uncertain, since they may have come from the highest summit, perhaps a mile to the east, though there is a slight depression between. If they were ice-borne this is the highest point at which glacial work has been found on the southern side of Gaspé. No granites, serpentines, or hornblende schists, such as might have come

from the Shickshocks, were seen; and probably these mountains were never crossed by a glacier moving southwards."[8]

With limited time and the urge to reach Grand River, we had to be selective. The broad Grand Cascapedia River, rising far to the north and flowing past several isolated and very alluring mountain-masses, was obviously too much of an undertaking. So we went on to New Richmond, thence to be driven as far as a road would take us up the valley of the Little Cascapedia. Then we went on by canoe as far up-stream as Brûlé Brook. The Little Cascapedia strongly resembles Grand River, really a very narrow or tiny river shut in by steep walls and cliffs, with none of the scoured and smoothed characteristics of a glaciated valley; and the flora was largely a repetition of that of Grand River; the beaches carpeted with *Dryas Drummondii* as handsome a ground-cover as could be imagined, and with another indigenous Dandelion, *Taraxacum lapponicum*.[9] But the margins of the beaches were characterized by a handsome pale-flowered and very distinct *Astragalus*, the later-distinguished *A. frigidus* var. *gaspensis* (its type from this valley); and the chiefly northwestern and densely white-woolly *Solidago hispida* var. *lanata* abounded. Another plant in the gravel was definitely not the common thick-leaved and everywhere naturalized *Plantago major*. Its small and smooth leaves were very thin and erect, its capsules tapering to summit, its seeds small, *P. major*, var. *Pilgeri*, now known in natural habitats across the continent. At the borders of the beach or on the slopes the chiefly cordilleran *Lonicera involucrata* abounded and here was a *Cynoglossum* which was certainly not the lilac-flowered *C. virginianum*. This more delicate plant had the much smaller flowers with clear blue corollas, the type-

[8] A. P. Coleman. Physiography and Glacial Geology of Gaspé Peninsula, Quebec, 25 (Geol. Sur. Can. Bull. No. 34—Geol. Ser. no. 41 (1922).

[9] When in RHODORA, XXXV. 383, 384 (1933) I cited *Taraxacum lapponicum* Kihlman (1884) as occurring in "Arctic and subarctic Eurasia and North America, south to Newfoundland and eastern Quebec" and placed in its synonymy *T. croceum* Dahlsdt. (1900), I received a prompt reprimand from a Scandinavian botanist because, he said, *T. croceum* is absolutely different. Dahlstedt, himself, to whom I referred our collections, seemed, however, as quoted by me in RHODORA, l. c. 122, to consider them conspecific in November, 1927, he then writing: "It has been very interesting to find that *T. lapponicum* (= *T. croceum* Dt.) is distributed also in arctic North America. This collective species . . . is widely distributed in northern and alpine parts of Fennoskandia and occurs also on Iceland and Greenland. It seems to me to be a very old species which surely inhabited the recently covered countries long before the last Skandinavian glaciation."

colony of the new *C. boreale*. Some species which we had thought of as alpine or subalpine were here near sea-level, *Carex atratiformis* and *Epilobium Hornemanni* for example; while others were here near or at their northeastern limits on the continent: *Alopecurus aristulatus, Carex abdita, Asarum canadense, Erigeron philadelphicus*, etc. Here for the first time in the summer we had a good opportunity to collect aquatics in quiet pools, such plants as *Sparganium chlorocarpum* var. *acaule, Potamogeton filiformis* var. *borealis, Sagittaria cuneata* and *Ranunculus subrigidus.* Our greatest delight, perhaps, was finding on the dripping limy walls, the northwestern American and northeastern Asiatic *Parnassia Kotzebuei,* a species heretofore known in eastern America only in Greenland. We greatly regretted the necessary briefness of our slight checking of the Little Cascapedia but we had to be moving. Brother Victorin and his companions later did a more thorough piece of exploring there.

The next stop was at the mouth of Bonaventure River, compared with the Little Cascapedia a very large stream with broad brackish and saline marshes and extensive limy arbor-vitae swamps at its mouth. This region was so fascinating and our host so accommodating that we spent three days (August 2–4) near the shore and three others (Aug. 5, 6 and 8) on the river. Such vast collections were made that more than half the time was used in caring for the presses. The marly arbor-vitae swamps about the mouth of the river and for some miles to the west gave us most of the species of such habitats which had previously interested us. In addition these limy and damp woods and their openings yielded several which we had not been seeing: *Sparganium minimum* in rills, our only Gaspé station; *Agropyron trachycaulum* var. *majus* and *Muhlenbergia glomerata* var. *cinnoides; Rhynchospora capillacea* at the only station we know on the Peninsula, a very distinct species which is highly localized as far to the northeast as Gaspé and western Newfoundland; *Carex hormathodes* (only a few stations so far to the north); the type-collection of *Juncus balticus* var. *stenocarpus; J. stygius* var. *americanus* (later found in the bog at Grand River but very rare in southern Gaspé); the equally local *Salix pyrifolia;* our only colony in southern Gaspé of *Betula pumila; Geocaulon lividum; Polygonum viviparum* var. *alpinum*, our first recognition of it in

America; *Stellaria crassifolia* on submerged bogs and knolls, a species which in eastern Canada seems to prefer the coast of the Gulf of St. Lawrence; *Ranunculus pensylvanicus* at our only Gaspé station, there associated with the reputedly western *R. Macounii*, so that we had an opportunity to contrast the two; and *Pyrola asarifolia* var. *purpurea*, the only time we saw it on the Peninsula. Here we suddenly recognized that the triple-nerved goldenrods of eastern Canada could not all be crowded into *Solidago canadensis* and *gigantea*. Here was another species, heretofore supposed to belong in the western part of the continent, *S. lepida*. The plant on the alluvium of Bonaventure River is var. *fallax*, the most widely dispersed variety, but other striking variations of the species were soon to be discovered. Brother Victorin and his companions subsequently explored this area and they here got the new *Gentiana gaspensis*, isolated member of a complex and nearly transcontinental series of technical species; unfortunately, we were too early for it.

The brackish marsh had some of the preceding species, but mostly another series. Further exploration of it would yield several more, but here were the first *Catabrosa aquatica* var. *laurentiana* we had ever seen, the type-colony of *Eleocharis halophila*, the rather local *Scirpus acutus*, the second Gaspé station for *Carex livida* var. *Grayana* (of broad Canadian range but, rather singularly, isolated in southern New Jersey) and the type-colony of *Galium trifidum* var. *halophilum*. Suddenly we became conscious that *Bidens* was in this saline or subsaline marsh, surely the wrong habitat for any species we had ever seen; but examination showed that the achenes were abundantly striate on each of the two flat faces. It did not fit anything we knew. This was our first (but not the last) encounter with the then almost unknown *B. hyperborea*, which had three years earlier been described from the foot of James Bay. Our plant was var. *laurentiana*, later found in brackish soil from eastern Gaspé to the lower Restigouche and beyond.

Bonaventure River, above the great marshes at its mouth, is one of the big rivers of the region, broad and shut in by steep walls of calcareous rock, largely red conglomerate. We were so fascinated by its flora that we made slow progress and barely reached the base of Baldé. To be sure, most of the notable

plants were those already seen, either from the banks and beaches of Grand River or from the Little Cascapedia, but we were still enthusiastic over such distinctive species as the *Parnassia* and the two *Astragali;* and the masses of *Dryopteris Robertiana*, hanging from ice-cold and dripping walls, gave us a new thrill, as did *Carex Garberi* var. *bifaria*, great masses of the type-colony of *C. flava* var. *gaspensis*, our only station on the Peninsula for the southern *Trillium undulatum*, the type-colony of *Amelanchier gaspensis*, and, on the beaches, such plants as *Equisetum variegatum* var. *Jesupi* (the only time seen) and *Agropyron trachycaulum* var. *novae-angliae*. The dripping walls, where so many fine things were growing were often covered with very loose and intricately forking mats of *Arenaria dawsonensis*, the plant I had described from the open and sunny beach at Carleton as *A. litorea*. Very recently Boivin in Nat. Canadien, lxxv. 216 (1948), has set off *A. dawsonensis* var. *litorea* because of its compact habit and dwarfness. Had he seen, in the same geographic region, that the type-colony was a xerophytic one, the type-sheets contain 10 and 13 individual plants, while on more sheltered and wet slopes the individual plants are so lax as completely to cover a standard herbarium-sheet, he would have recognized ecological responses only.

We were forced to remember that the little steep-walled valley of Grand River was our important objective. It was now close time on salmon-fishing and Mr. Cabot had provided me with a letter, directing his warden to take us wherever we wished to botanize up the fascinating valley, the type-region of several notable plants. But, alas, although we had reckoned with our host, he had not reckoned with his employe. Arriving at the mouth of Grand River, we learned that the warden was up-river and beyond reach, with a group of county-officials "enjoying forbidden fruit". After some days of waiting we moved on and the most promising valley of the river still awaits midsummer and autumn exploration.[10] During the hopeful waiting for our guide we dared not wander far away. The little marl-bog was, naturally, revisited. *Rubus acaulis* was now mature, with

[10] On later trips on the Peninsula we were reminded of the officers of the law who had thwarted us, for it soon became quite evident that, after the closed season on shooting caribou had come, various game-wardens and licensed guides lived largely on "mountain mutton."

lusciously wine-like fruit, and with it another of the same subgenus, our first collection of *R. arcticus*. *Carex chordorrhiza*, our only Gaspé collection, sprawled over the other vegetation, its prolonged stems sending up from their axils the fruiting culms, a most unusual habit in the genus; and here was another station for the rather local *Juncus stygius* var. *americanus*. Best of all, the lower part of the bog was a carpet of three sundews: the somewhat ubiquitous *Drosera rotundifolia* and our first colonies of *D. anglica* and *linearis*, the two latter never again met by us in Gaspé. Another marly and inundated spot was the peaty margin of Trout Pond. Here the great prizes were a tiny little bedstraw, the type-colony of *Galium brevipes*, a species subsequently found westward to the Lake Superior region and, so far as we yet know, isolated in Greenland. With it was the remarkable *Drosera rotundifolia* var. *comosa*, tiny plants with flowers replaced by tufts of leaves, these dropping off and reproducing the colony vegetatively.

We attempted to follow up-river on foot, but that project proved too difficult. At the mouth of the river, however, there was a fine clump of what seemed like a strange willow. This proved to be the new *Salix paraleuca*, a local species subsequently found on the Côte Nord. Otherwise, we had to content ourselves with the more open country back of the coastal bluffs. The latter, consisting of red sandstone and conglomerate were deeply undercut by the waves and one had to be cautious about approaching the edge, which frequently collapsed. Along this treacherous front we found the northernmost extreme of *Lobelia spicata*, the var. *hirtella*, this being our only Gaspé station for it; but our attention was chiefly absorbed by two asters which were new to us. One, abundant, was the type of *Aster foliaceus* var. *subpetiolatus*, thus far known only about the Gulf of St. Lawrence; the other, less abundant, the type of *A. foliaceus* var. *crenifolius*, a plant which, later, was called *A. crenifolius*. The latter was so near the treacherous overhang that it is feared that the colony has gone into the sea.

Moving on to the east, our next base was at Percé, now a tourist-resort, but then in its primitive state as primarily a great

cod-fishery.[11] The details of our brief stay there, the unsavory living-conditions but the stimulating discoveries have already been published in the paper on field-work with Collins and should not be repeated here. A few additional plants of special interest may, however, be noted. We had followed the coastal peaks and cliffs as far north as the beginning of the Grande Coupe and westward to Cap Blanc. Practically all rills and natural swales were inhabitated by *Glyceria fluitans*, the typical plant of Eurasia and apparently native here. Many of the calcareous walls and slopes bore *Hackelia americana* which we first saw near the summit of Tracadigash Mountain; and *Polystichum Lonchitis*, extremely variable in size in response to aridity or moisture abounded. *Calamagrostis inexpansa* var. *brevior* was common, but here were the only colonies we have ever met in Gaspé of two common species farther south and west: *Juncus articulatus* in a wet depression; *Luzula acuminata* in woods on Mt. Ste. Anne, where subsequent botanizers have also got it. From this first visit to Percé we brought away the types of 3 new species, 5 new varieties and several new forms. These all came from the higher crests, walls or mountains, this area thus characterized by Coleman, l. c. 23:

"From Corner of the Beach a road follows the shore southeastward to Percé, rising on terraces up to 225 or 230 feet, and then passing over hills. Blocks of granite and gneiss were seen above this, and a gneiss boulder 3 feet long was observed at 262 feet above the sea, indicating that floating ice must have reached this level, which is about 20 feet above the highest marine terrace indicated by Chalmers and Fairchild.

Except a little boulder clay on the road southwest of Percé no evidence of glacial action was seen, and the mountain having an elevation of 1,230 feet as shown on the map, must have risen above the [floating] ice."

From Percé we drove to Douglastown on the west side of Gaspé Bay, stopping on the way beyond Corner of the Beach on the beach –or "barachois") and brackish pond-like lagoon back of the Barachois de Malbaie. Here was a very interesting habitat, which will repay further exploration with a boat, which,

[11] The long-established French names (some coming down from the discoverer, Cartier) Les Murailles, Cap Rouge, etc., were in use. Several years later, after the automobile-road around the Peninsula was made, the road soon lined with tourist-homes, up-to-date eating-places, etc., I arrived in Percé, to be greeted by a tourist with "Which is the Peak of Dawn?" Inquiry disclosed that it was good old Mont Rouge, which, with all its neighbors, had lost its identity.

in our migration, we did not have time to do. This region was covered by shore-ice during the Pleistocene and we did not get above the old marine shelf. The striking feature of the flora of this old sea-margin was, therefore, the complete lack of the plants which had been interesting us. My daily records of all plants seen cite none of those fascinating species. Instead, the most interesting plants of this shore and the adjacent lagoon were the following: *Typha latifolia* (only two other stations seen by us on the Peninsula), *Juniperus communis* var. *depressa* (ditto), *Potamogeton pectinatus*, *Calamagrostis canadensis*, *Deschampsia flexuosa*, *Spartina pectinata*, *Scirpus validus* var. *creber*, *Carex lasiocarpa* var. *americana* and other species which, except for their infrequency in or absence from the area we had been traversing, could arouse no enthusiasm. Here, however, was our first material of *Euphrasia Randii* var. *Rockii* and our first meeting with the arctic *Carex rariflora*, the latter usually an alpine species in Gaspé.

Reaching Douglastown, we did our best to find interesting plants in the immediate region of that town, along the shores of Gaspé Bay, and slightly up the St. John or Douglastown River. But, alas, something had happened; our luck had gone! We might have been in the most ordinary and unthrilling glacially denuded country farther west and south. Most of the plants of Barachois de Malbaie were there and many scores of the same tedious series: *Lycopodium complanatum* var. *flabelliforme*, *Botrychium multifidum*, *Sparganium chlorocarpum* (our only Gaspé collection), *Potamogeton perfoliatus* var. *bupleuroides*, *Sagittaria cuneata*, *Agrostis perennans*, *Eleocharis acicularis*, *Carex canescens* var. *disjuncta*, *C. silicea* (our only station) and *C. communis*, *Sanicula marilandica*, *Plantago oliganthos*, *Galium tinctorium*, *Solidago rugosa*, *Aster radula* and *Prenanthes trifoliata*. We had two days of collecting the common plants of our "home-towns", but did a conscientious job because many of them were not generally distributed over the Gaspé Peninsula. There were, of course, some species novel to us, for a newly explored area rarely fails to have something of interest. Here we met for the first time the halophytic or semihalophytic *Hippuris tetraphylla* and *Plantago eriopoda*, and in the water at the mouth of St. John River the type-colony of *Potamogeton Berchtoldi* var. *colpophilus;*

while in the thickets there was another variation of *Aster foliaceus*, the new var. *arcuans*. Clearings were the home of a strange *Rhinanthus*, which later proved to be rather general southward to Percé, the European *R. stenophyllus*, looking native, but possibly merely naturalized.

Moving on to the port of Gaspé Basin in order to catch the next boat westward and homeward we did little further exploring, the flora about the town not specially tempting us. We felt it important to try the lower reaches of Dartmouth and York Rivers, which enter Gaspé Bay from the west. The same luck as at the mouth of St. John River which also enters the Bay from the west: a very small minimum of plants we had been seeing on river-gravels to the west, but the dominating flora was made up of the common plants of much of New England and points south; many of the same uninteresting or (outside Gaspé) ubiquitous species, with, of course, some additions. Characteristic of this to us uninspiring but typical flora of the lower marine terrace about the mouth of the Dartmouth were such plants, well known as far south as New Jersey, Delaware, Maryland or Virginia, as typical *Spartina alterniflora*, *Scirpus paludosus* var. *atlanticus*, *Carex pallescens* var. *neogaeas* and *C. viridula*, *Potentilla fruticosa*, *Myriophyllum exalbescens* and *M. verticillatum* var. *pectinatum*, *Angelica atropurpurea* and *Limosella subulata*, many of these (except the strictly coastal) also of wide range westward. Others reach south to the Carolinas, Georgia or Alabama: such species as *Poa palustris*, *Carex gracillima*, *Rosa virginiana*, *Aralia hispida*, *Lysimachia terrestris*, *Lycopus uniflorus*, *Eupatorium maculatum* and *Aster umbellatus*. Still worse, several others come north from or extend south to Florida, Mississippi, Louisiana or eastern Texas: a group of bourgeois plants like *Onoclea sensibilis*, *Dryopteris cristata*, *Pteridium aquilinum* var. *latiusculum*, *Phragmites communis* var. *Berlandieri* (our only Gaspé station), *Elymus virginicus*, *Leersia oryzoides*, *Cardamine pensylvanica*, etc., etc. These were not the plants we had come to the tip of Gaspé to see and we were not then enthusiastic about them. Only one novelty was seen, another variety of *Bidens hyperborea* of saline soil, the type-colony of var. *gaspensis*.

This essential lack of most of the more interesting and localized plants of the unglaciated or nearly unglaciated areas, like the

summit-cliffs of Tracadigash Mountain, the crests at Percé, the cliffs and shores of the Little Cascapedia and of Grand River, and their replacement by the ubiquitous and aggressive species of broad and usually continuous range westward and southward puzzled and disturbed us, but the solution remained a mystery until Dr. Coleman, studying the area around Gaspé Bay, clearly stated it:

"Boulder clay occurs scantily along the northeast shore of the bay, the stones contained in it being mostly local, though fragments of hornblende schist and of an agglomerate formed of some basic eruptive must have come from the interior.

There are well-marked striae on sandstone near Grande Grève and at other places, the direction being parallel to the axis of the bay.

On the southwest side of the bay, and on the shore of Gaspé basin also, boulder clay is rather common, enclosing only local stones except for some hornblende schists. Striae were found on sandstone on the promontory between the two bays, running southwest, as if the local glacier coming down the Dartmouth valley had spread westwards.

The hill behind the village of Gaspé rises to 477 feet and shows no evidence of ice action, the boulders upon it seeming entirely local. Its summit may have risen above the glacier, which does not seem to have been very thick.

Terraces, usually indistinct, occur at 45, 70, and 180 feet. One or two small fragments of granite or gneiss were found, perhaps rafted round from the Labrador coast when the sea stood higher. Both Chalmers and Fairchild report a marine level at 235 or 240 feet, but this was not observed by the writer, perhaps because not sufficiently looked for.

The glaciers coming down the Dartmouth and York valleys and combining in the basin of Gaspé bay, as suggested by Chalmers, must have been among the most important of the local glaciers or ice-sheets radiating from the mountains, and their effects are more readily recognized than those of the northern glaciers mentioned before."—Coleman, l. c. 22, 23.

From Coleman's statement of the situation it was clear that the glaciated area about Gaspé Bay had largely lost the plants which characterize the unglaciated areas of the Peninsula, but had received the aggressive and rapidly colonizing flora which covers so much of the glaciated regions of the northeastern states and southern Canada. Most fortunately, our conscientious collecting or recording the plants of the region now was producing significant results.

Opposite Gaspé Basin the waste ground and ballast-lands about the great fish-houses at York were the home (at least temporarily) of a great number of adventives. We took samples of all but the commonest weeds of eastern Canada, for several of them were

new to us. We felt as the enthusiasts over ballast-filling farther south in the days of sailing vessels, for, besides such generally naturalized adventives of eastern North America as *Bromus commutatus*, *Urtica dioica*, *Coronopus didymus*, *Diplotaxis muralis*, *Capsella rubella*, *Vicia hirsuta*, *Erodium moschatum*, *Stachys palustris*, *Tussilago Farfara*, *Senecio Jacobaea* and numerous others (several from our only Gaspé station), here was an assemblage of less familiar wanderers, doubtless brought in Transatlantic shipping. Here we made our only Gaspé collections, the species marked with an asterisk the only representatives from Canada in the Gray Herbarium: **Rumex bucephalophorus* L., **Chenopodium Vulvaria*, **Diplotaxis erucoides* (abundant and coloring the area), *Medicago hispida* and **M. sphaerocarpa* Bertol. The *Trifolium pratense* here and at various other localities in the area (on roadsides, etc.) was the dwarf extreme which was new to us, the plants only a few inches high and with small leaves and heads, true *T. pratense* (our var. *frigidum* Gaudin), the taller and larger plant which spreads from cultivation being var. *sativum*.

Thus our summer's botanizing had started without many discoveries on the Prepleistocene coastal terraces of southwestern Gaspé where the evidences of glacial activity down the Matapedia Valley are pronounced (see Coleman, l. c. 25, 26); then it rapidly developed a crescendo as we explored the unglaciated upper cliffs of Tracadigash Mountain, the barely or hardly glaciated narrow and shut-in valley of the Little Cascapedia, and it reached fortissimo on the rugged, ragged and towering cliffs and crests rising high above the but slightly glaciated foreland at Percé; then, with a disheartening dimuendo, we came down from our exalted enthusiasm to the commonplace of definitely glaciated Gaspé Bay, and finally ended our season on ballast-land and rubbish-piles.